

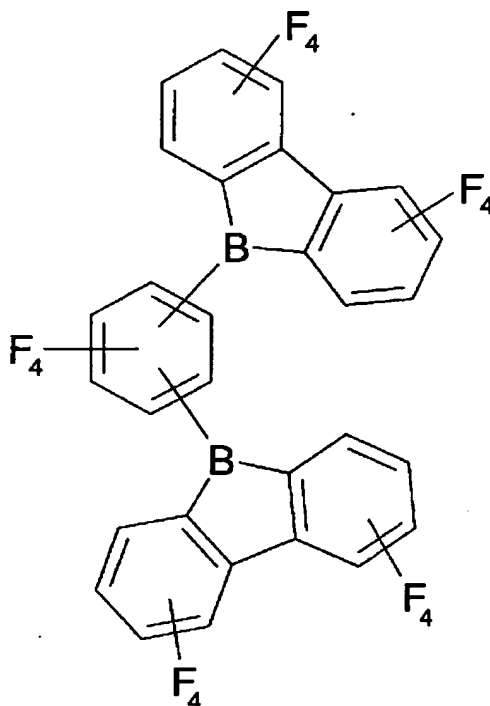
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LISTING OF THE CLAIMS

1. (original) A method for cationically polymerizing olefin monomer comprising the step of using a composition having the chemical structure:

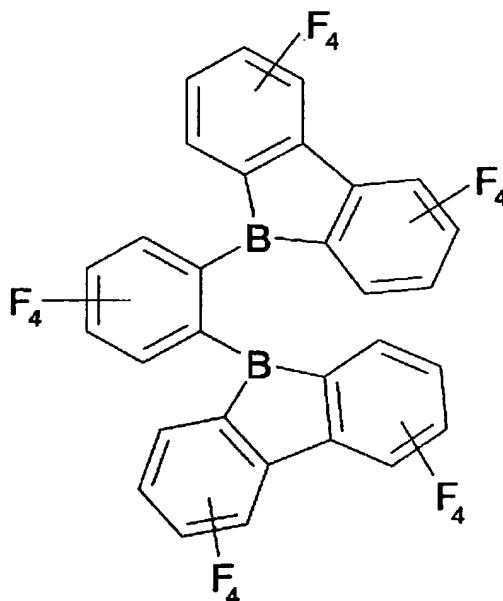


as a coinitiator in an organic phase or a neat monomer reaction phase.

2. (original) The method of claim 1, wherein the chemical structure is:

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3. (original) The method of claim 1, wherein the olefin monomer is selected from the group consisting of:

ethylene, propylene, butene, pentene, hexene, heptene, octene, nonene, decene, dodecene, dodecyldecene, 3-methyl pentene, 3,5,5-trimethylhexene, isobutene, 2-methyl-butene, 2-methyl-pentene, vinyl ether, vinyl carbazole, isoprene, and combinations thereof.

4. (original) The method of claim 1, wherein the olefin monomer is a C<sub>2</sub> – C<sub>30</sub> olefin or a C<sub>2</sub> – C<sub>30</sub> diolefin.

5. (original) The method of claim 1, wherein the olefin monomer is isobutene.

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6. (original) The method of claim 1, wherein the organic phase is a hydrocarbon solution of the monomer or a halogenated-hydrocarbon solution of the monomer.

7. (original) The method of claim 1, wherein the neat-monomer reaction phase is a liquid monomer.

8. (original) A method for cationically polymerizing olefin monomer comprising the step of using a composition having the chemical structure:



as a coinitiator in an organic phase or a neat monomer reaction phase;

wherein each R is independently selected from the group consisting of a perfluorophenyl; 3,5-bis(trifluoromethyl)phenyl; 1-perfluoronaphthyl; 2-perfluoronaphthyl; 2-perfluorobiphenyl; 3-perfluorobiphenyl; 4-perfluorobiphenyl; and  $\text{p-R}^{\text{Si}}\text{-2,3,5,6-tetrafluorophenyl}$ ;

wherein R' is 1,2-perfluorophenylene; 1,2-perfluoronaphthalene; 2,3-perfluoronaphthalene; 1,8-perfluoronaphthalene; 1,2-perfluoroanthracene; 2,3-perfluoroanthracene; 1,9-perfluoroanthracene; 1,2-perfluorophenanthrene; 2,3-perfluorophenanthrene; 1,10-perfluorophenanthrene; 9,10-perfluorophenanthrene; 2,2'-perfluorobiphenylene; 2,2'-perfluoro-1,1'-binaphthalene; 3,3'-perfluoro-2,2'-binaphthalene; or 1,1'-ferrocene; and

wherein R" is a C<sub>1</sub>, C<sub>2</sub>, C<sub>3</sub>, C<sub>4</sub>, C<sub>5</sub>, C<sub>6</sub>, C<sub>7</sub>, C<sub>8</sub>, C<sub>9</sub>, or C<sub>10</sub> alkyl.

9. (original) The method of claim 8, wherein the olefin monomer is selected from the group consisting of:

ethylene, propylene, butene, pentene, hexene, heptene, octene, nonene, decene, dodecene, dodecyldocene, 3-methyl pentene, 3,5,5-trimethylhexene, isobutene, 2-methyl-butene, 2-methyl-pentene, vinyl ether, vinyl carbazole, isoprene, and combinations thereof.

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10. (original) The method of claim 8, wherein the olefin monomer is a C<sub>2</sub> – C<sub>30</sub> olefin or a C<sub>2</sub> – C<sub>30</sub> diolefin.

11. (original) The method of claim 8, wherein the olefin monomer is isobutene.

12. (original) The method of claim 8, wherein the organic phase is a hydrocarbon solution of the monomer or a halogenated-hydrocarbon solution of the monomer.

13. (original) The method of claim 8, wherein the neat monomer reaction phase is a liquid monomer.

14. (currently amended) A method for cationically polymerizing olefin monomer comprising the step of using a composition having the chemical structure:



as a coinitiator in an organic phase or neat monomer reaction phase

wherein Y is boron or aluminum;

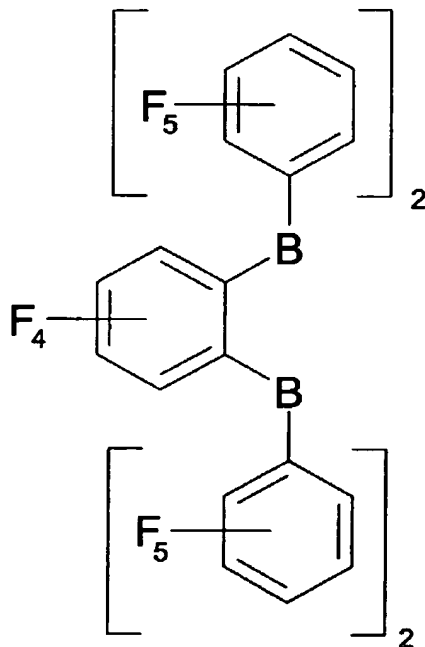
wherein each R is independently selected from the group consisting of a perfluorophenyl; 3,5-bis(trifluoromethyl)phenyl; 1-perfluoronaphthyl; 2-perfluoronaphthyl; 2-perfluorobiphenyl; 3-perfluorobiphenyl; 4-perfluorobiphenyl; and p-R"<sub>3</sub>Si-2,3,5,6-tetrafluorophenyl;

wherein R' is 1,2-perfluorophenylene; 1,2-perfluoronaphthalene; 2,3-perfluoronaphthalene; 1,8-perfluoronaphthalene; 1,2-perfluoroanthracene; 2,3-perfluoroanthracene; 1,9-perfluoroanthracene; 1,2-perfluorophenanthrene; 2,3-perfluorophenanthrene; 1,10-perfluorophenanthrene; 9,10-perfluorophenanthrene; 2,2'-perfluorobiphenylene; 2,2'-perfluoro-1,1'-binaphthalene; 3,3'-perfluoro-2,2'-binaphthalene; or 1,1'-ferrocene; and

wherein R" is a C<sub>1</sub>, C<sub>2</sub>, C<sub>3</sub>, C<sub>4</sub>, C<sub>5</sub>, C<sub>6</sub>, C<sub>7</sub>, C<sub>8</sub>, C<sub>9</sub>, or C<sub>10</sub> alkyl.

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15. (original) The method of claim 14, wherein the chemical structure is:



16. (original) The method of claim 14, wherein the olefin monomer is selected from the group consisting of:

ethylene, propylene, butene, pentene, hexene, heptene, octene, nonene, decene, dodecene, dodecyldocene, 3-methyl pentene, 3,5,5-trimethylhexene, isobutene, 2-methyl-butene, 2-methyl-pentene, vinyl ether, vinyl carbazole, isoprene, and combinations thereof.

17. (original) The method of claim 14, wherein the olefin monomer is a C<sub>2</sub> – C<sub>30</sub> olefin or a C<sub>2</sub> – C<sub>30</sub> diolefin.

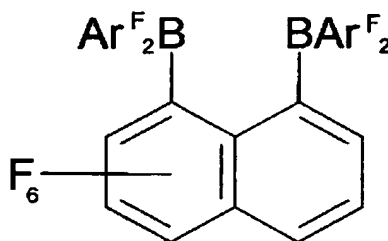
18. (original) The method of claim 14, wherein the olefin monomer is isobutene.

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19. (original) The method of claim 14, wherein the organic phase is a hydrocarbon solution of the monomer or a halogenated-hydrocarbon solution of the monomer.

20. (original) The method of claim 14, wherein the neat-monomer reaction phase is a liquid monomer.

21. (original) A method for cationically polymerizing olefin monomers comprising the step of using a composition having the chemical structure:



wherein  $\text{Ar}^{\text{F}} = \text{C}_6\text{F}_5$  or  $\text{Ar}^{\text{F}}_2 = \text{C}_{12}\text{F}_8$  as a coinitiator in an organic phase or neat monomer reaction phase.

22. (original) The method of claim 21, wherein the olefin monomer is selected from the group consisting of:

ethylene, propylene, butene, pentene, hexene, heptene, octene, nonene, decene, dodecene, dodecyldocene, 3-methyl pentene, 3,5,5-trimethylhexene, isobutene, 2-methyl-butene, 2-methyl-pentene, vinyl ether, vinyl carbazole, isoprene, and combinations thereof.

23. (original) The method of claim 21, wherein the olefin monomer is a  $\text{C}_2 - \text{C}_{30}$  olefin or a  $\text{C}_2 - \text{C}_{30}$  diolefin.

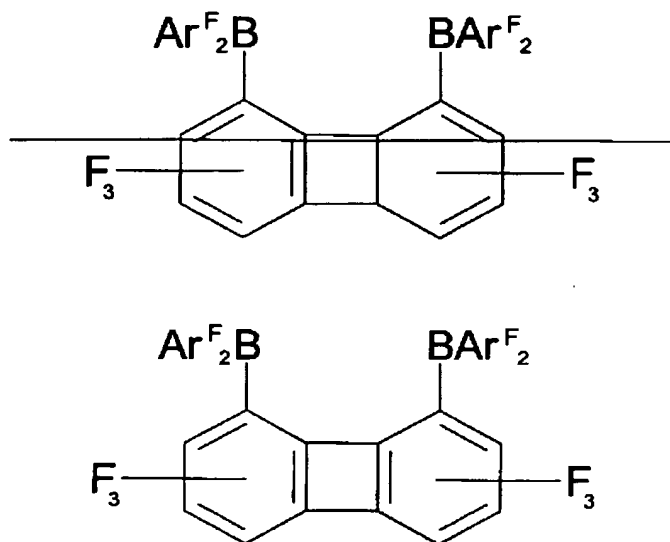
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24. (original) The method of claim 21, wherein the olefin monomer is isobutene.

25. (original) The method of claim 21, wherein the organic phase is a hydrocarbon solution of the monomer or a halogenated-hydrocarbon solution of the monomer.

26. (original) The method of claim 21, wherein the neat-monomer reaction phase is a liquid monomer.

27. (currently amended) A method for cationically polymerizing olefin monomers comprising the step of using a composition having the chemical structure:



wherein  $\text{Ar}^{\text{F}} = \text{C}_6\text{F}_5$  or  $\text{Ar}^{\text{F}}_2 = \text{C}_{12}\text{F}_8$  as a coinitiator in an organic phase or neat monomer reaction phase.

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28. (original) The method of claim 27, wherein the olefin monomer is selected from the group consisting of:

ethylene, propylene, butene, pentene, hexene, heptene, octene, nonene, decene, dodecene, dodecyldocene, 3-methyl pentene, 3,5,5-trimethylhexene, isobutene, 2-methyl-butene, 2-methyl-pentene, vinyl ether, vinyl carbazole, isoprene, and combinations thereof.

29. (original) The method of claim 27, wherein the olefin monomer is a  $C_2 - C_{30}$  olefin or a  $C_2 - C_{30}$  diolefin.

30. (original) The method of claim 27, wherein the olefin monomer is isobutene.

31. (original) The method of claim 27, wherein the organic phase is a hydrocarbon solution of the monomer or a halogenated-hydrocarbon solution of the monomer.

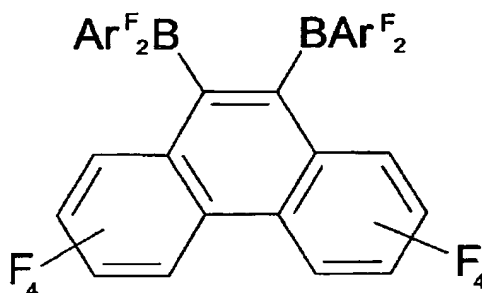
32. (original) The method of claim 27, wherein the neat-monomer reaction phase is a liquid monomer.

33. (original) A method for cationically polymerizing olefin monomers comprising the step of using a composition having the chemical structure:



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wherein Ar<sup>F</sup> = C<sub>6</sub>F<sub>5</sub> or Ar<sup>F</sup><sub>2</sub> = C<sub>12</sub>F<sub>8</sub> as a coinitiator in an organic phase or neat monomer reaction phase.

34. (original) The method of claim 33, wherein the olefin monomer is selected from the group consisting of:

ethylene, propylene, butene, pentene, hexene, heptene, octene, nonene, decene, dodecene, dodecyldocene, 3-methyl pentene, 3,5,5-trimethylhexene, isobutene, 2-methyl-butene, 2-methyl-pentene, vinyl ether, vinyl carbazole, isoprene, and combinations thereof.

35. (original) The method of claim 33, wherein the olefin monomer is a C<sub>2</sub> – C<sub>30</sub> olefin or a C<sub>2</sub> – C<sub>30</sub> diolefin.

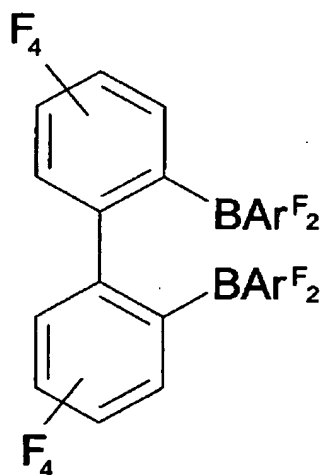
36. (original) The method of claim 33, wherein the olefin monomer is isobutene.

37. (original) The method of claim 33, wherein the organic phase is a hydrocarbon solution of the monomer or a halogenated-hydrocarbon solution of the monomer.

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38. (original) The method of claim 33, wherein the neat-monomer reaction phase is a liquid monomer.

39. (original) A method for cationically polymerizing olefin monomers comprising the step of using a composition having the chemical structure:



wherein Ar<sup>F</sup> = C<sub>6</sub>F<sub>5</sub> or Ar<sup>F</sup><sub>2</sub> = C<sub>12</sub>F<sub>8</sub> as a coinitiator in an organic phase or neat monomer reaction phase.

40. (original) The method of claim 39, wherein the olefin monomer is selected from the group consisting of:

ethylene, propylene, butene, pentene, hexene, heptene, octene, nonene, decene, dodecene, dodecyldocene, 3-methyl pentene, 3,5,5-trimethylhexene, isobutene, 2-methyl-butene, 2-methyl-pentene, vinyl ether, vinyl carbazole, isoprene, and combinations thereof.

41. (original) The method of claim 39, wherein the olefin monomer is a C<sub>2</sub> – C<sub>30</sub> olefin or a C<sub>2</sub> – C<sub>30</sub> diolefin.

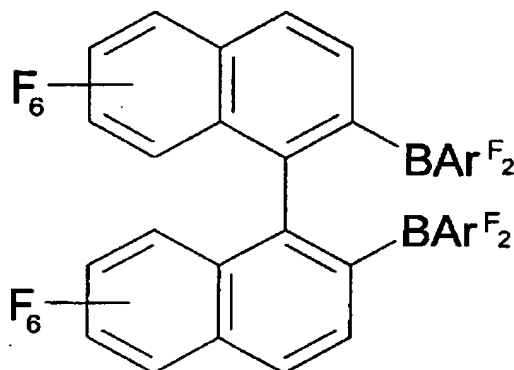
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42. (original) The method of claim 39, wherein the olefin monomer is isobutene.

43. (original) The method of claim 39, wherein the organic phase is a hydrocarbon solution of the monomer or a halogenated-hydrocarbon solution of the monomer.

44. (original) The method of claim 39, wherein the neat-monomer reaction phase is a liquid monomer.

45. (original) A method for cationically polymerizing olefin monomers comprising the step of using a composition having the chemical structure:



wherein Ar<sup>F</sup> = C<sub>6</sub>F<sub>5</sub> or Ar<sup>F</sup><sub>2</sub> = C<sub>12</sub>F<sub>8</sub> as a coinitiator in an organic phase or neat monomer reaction phase.

46. (original) The method of claim 45, wherein the olefin monomer is selected from the group consisting of:

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ethylene, propylene, butene, pentene, hexene, heptene, octene, nonene, decene, dodecene, dodecyldocene, 3-methyl pentene, 3,5,5-trimethylhexene, isobutene, 2-methyl-butene, 2-methyl-pentene, vinyl ether, vinyl carbazole, isoprene, and combinations thereof.

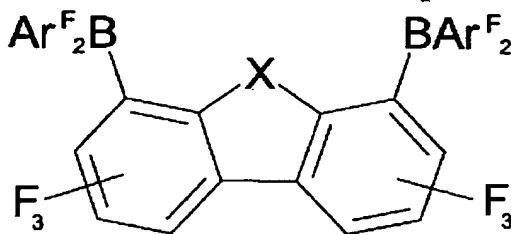
47. (original) The method of claim 45, wherein the olefin monomer is a  $C_2 - C_{30}$  olefin or a  $C_2 - C_{30}$  diolefin.

48. (original) The method of claim 45, wherein the olefin monomer is isobutene.

49. (original) The method of claim 45, wherein the organic phase is a hydrocarbon solution of the monomer or a halogenated-hydrocarbon solution of the monomer.

50. (original) The method of claim 45, wherein the neat-monomer reaction phase is a liquid monomer.

51. (original) A method for cationically polymerizing olefin monomers comprising the step of using a composition having the chemical structure:



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wherein  $X=CH_2$ , NR, or O and  $Ar^F = C_6F_5$  or  $Ar^F_2 = C_{12}F_8$  as a coinitiator in an organic phase or neat monomer reaction phase.

52. (original) The method of claim 51, wherein the olefin monomer is selected from the group consisting of:

ethylene, propylene, butene, pentene, hexene, heptene, octene, nonene, decene, dodecene, dodecyldocene, 3-methyl pentene, 3,5,5-trimethylhexene, isobutene, 2-methyl-butene, 2-methyl-pentene, vinyl ether, vinyl carbazole, isoprene, and combinations thereof.

53. (original) The method of claim 51, wherein the olefin monomer is a  $C_2 - C_{30}$  olefin or a  $C_2 - C_{30}$  diolefin.

54. (original) The method of claim 51, wherein the olefin monomer is isobutene.

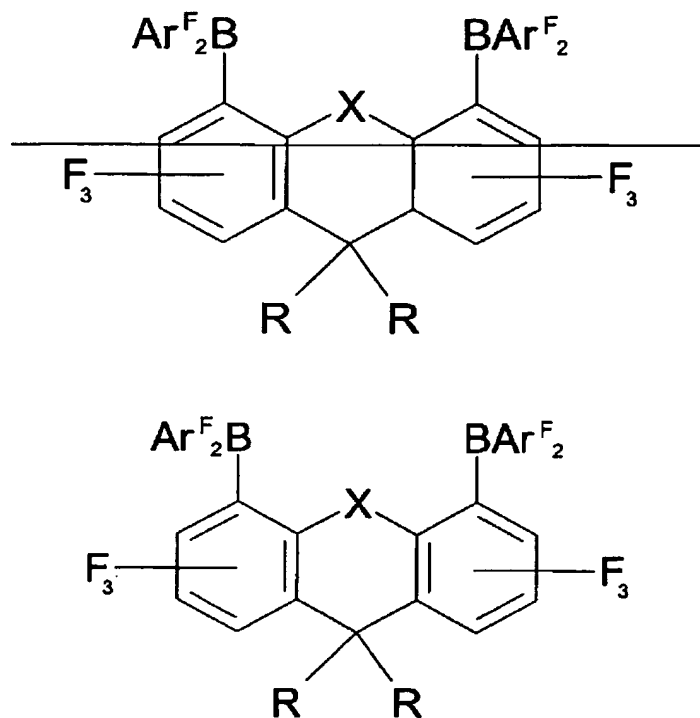
55. (original) The method of claim 51, wherein the organic phase is a hydrocarbon solution of the monomer or a halogenated-hydrocarbon solution of the monomer.

56. (original) The method of claim 51, wherein the neat-monomer reaction phase is a liquid monomer.

57. (currently amended) A method for cationically polymerizing olefin monomers comprising the step of using a composition having the chemical structure:

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wherein  $X=CH_2$ ,  $NR$ , or  $O$  and  $Ar^F = C_6F_5$  or  $Ar^F_2 = C_{12}F_8$  as a coinitiator in an organic phase or neat monomer reaction phase.

58. (original) The method of claim 57, wherein the olefin monomer is selected from the group consisting of:

ethylene, propylene, butene, pentene, hexene, heptene, octene, nonene, decene, dodecene, dodecyldecene, 3-methyl pentene, 3,5,5-trimethylhexene, isobutene, 2-methyl-butene, 2-methyl-pentene, vinyl ether, vinyl carbazole, isoprene, and combinations thereof.

59. (original) The method of claim 57, wherein the olefin monomer is a  $C_2 - C_{30}$  olefin or a  $C_2 - C_{30}$  diolefin.

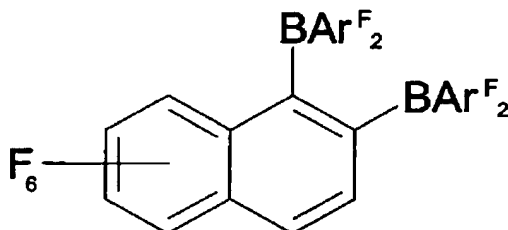
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60. (original) The method of claim 57, wherein the olefin monomer is isobutene.

61. (original) The method of claim 57, wherein the organic phase is a hydrocarbon solution of the monomer or a halogenated-hydrocarbon solution of the monomer.

62. (original) The method of claim 57, wherein the neat-monomer reaction phase is a liquid monomer.

63. (original) A method for cationically polymerizing olefin monomers comprising the step of using a composition having the chemical structure:



wherein  $\text{Ar}^{\text{F}} = \text{C}_6\text{F}_5$  or  $\text{Ar}^{\text{F}}_2 = \text{C}_{12}\text{F}_8$  as a coinitiator in an organic phase or neat monomer reaction phase.

64. (original) The method of claim 63, wherein the olefin monomer is selected from the group consisting of:

ethylene, propylene, butene, pentene, hexene, heptene, octene, nonene, decene, dodecene, dodecyldocene, 3-methyl pentene, 3,5,5-trimethylhexene, isobutene, 2-methyl-butene, 2-methyl-pentene, vinyl ether, vinyl carbazole, isoprene, and combinations thereof.

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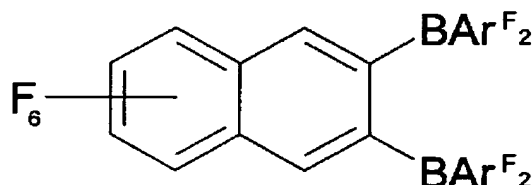
65. (original) The method of claim 63, wherein the olefin monomer is a  $C_2 - C_{30}$  olefin or a  $C_2 - C_{30}$  diolefin.

66. (original) The method of claim 63, wherein the olefin monomer is isobutene.

67. (original) The method of claim 63, wherein the organic phase is a hydrocarbon solution of the monomer or a halogenated-hydrocarbon solution of the monomer.

68. (original) The method of claim 63, wherein the neat-monomer reaction phase is a liquid monomer.

69. (original) A method for cationically polymerizing olefin monomers comprising the step of using a composition having the chemical structure:



wherein  $Ar^F = C_6F_5$  or  $Ar^F_2 = C_{12}F_8$  wherein as a coinitiator in an organic phase or neat monomer reaction phase.

70. (original) The method of claim 69, wherein the olefin monomer is selected from the group consisting of:



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ethylene, propylene, butene, pentene, hexene, heptene, octene, nonene, decene, dodecene, dodecyldocene, 3-methyl pentene, 3,5,5-trimethylhexene, isobutene, 2-methyl-butene, 2-methyl-pentene, vinyl ether, vinyl carbazole, isoprene, and combinations thereof.

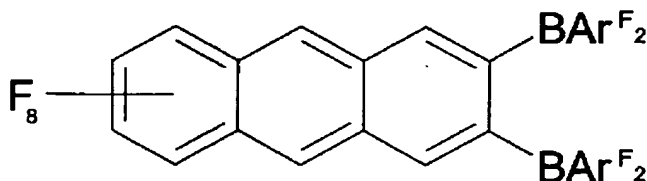
71. (original) The method of claim 69, wherein the olefin monomer is a  $C_2 - C_{30}$  olefin or a  $C_2 - C_{30}$  diolefin.

72. (original) The method of claim 69, wherein the olefin monomer is isobutene.

73. (original) The method of claim 69, wherein the organic phase is a hydrocarbon solution of the monomer or a halogenated-hydrocarbon solution of the monomer.

74. (original) The method of claim 69, wherein the neat-monomer reaction phase is a liquid monomer.

75. (original) A method for cationically polymerizing olefin monomers comprising the step of using a composition having the chemical structure:



wherein  $Ar^F = C_6F_5$  or  $Ar^F_2 = C_{12}F_8$  wherein as a coinitiator in an organic phase or neat monomer reaction phase.

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76. (original) The method of claim 75, wherein the olefin monomer is selected from the group consisting of:

ethylene, propylene, butene, pentene, hexene, heptene, octene, nonene, decene, dodecene, dodecyldocene, 3-methyl pentene, 3,5,5-trimethylhexene, isobutene, 2-methyl-butene, 2-methyl-pentene, vinyl ether, vinyl carbazole, isoprene, and combinations thereof.

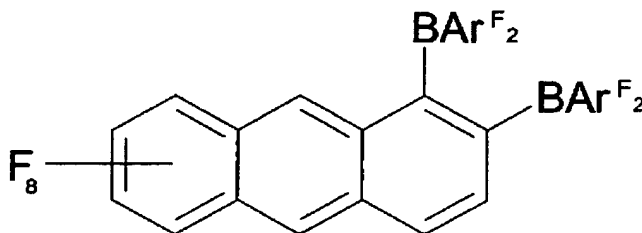
77. (original) The method of claim 75, wherein the olefin monomer is a  $C_2 - C_{30}$  olefin or a  $C_2 - C_{30}$  diolefin.

78. (original) The method of claim 75, wherein the olefin monomer is isobutene.

79. (original) The method of claim 75, wherein the organic phase is a hydrocarbon solution of the monomer or a halogenated-hydrocarbon solution of the monomer.

80. (original) The method of claim 75, wherein the neat-monomer reaction phase is a liquid monomer.

81. (original) A method for cationically polymerizing olefin monomers comprising the step of using a composition having the chemical structure:



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wherein  $\text{Ar}^{\text{F}} = \text{C}_6\text{F}_5$  or  $\text{Ar}^{\text{F}}_2 = \text{C}_{12}\text{F}_8$  as a coinitiator in an organic phase or neat monomer reaction phase.

82. (original) The method of claim 81, wherein the olefin monomer is selected from the group consisting of:

ethylene, propylene, butene, pentene, hexene, heptene, octene, nonene, decene, dodecene, dodecyldocene, 3-methyl pentene, 3,5,5-trimethylhexene, isobutene, 2-methyl-butene, 2-methyl-pentene, vinyl ether, vinyl carbazole, isoprene, and combinations thereof.

83. (original) The method of claim 81, wherein the olefin monomer is a  $\text{C}_2 - \text{C}_{30}$  olefin or a  $\text{C}_2 - \text{C}_{30}$  diolefin.

84. (original) The method of claim 81, wherein the olefin monomer is isobutene.

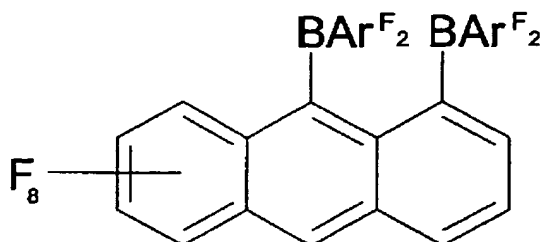
85. (original) The method of claim 81, wherein the organic phase is a hydrocarbon solution of the monomer or a halogenated-hydrocarbon solution of the monomer.

86. (original) The method of claim 81, wherein the neat-monomer reaction phase is a liquid monomer.

87. (original) A method for cationically polymerizing olefin monomers comprising the step of using a composition having the chemical structure:

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wherein  $Ar^F = C_6F_5$  or  $Ar^{F_2} = C_{12}F_8$  as a coinitiator in an organic phase or neat monomer reaction phase.

88. (original) The method of claim 87, wherein the olefin monomer is selected from the group consisting of:

ethylene, propylene, butene, pentene, hexene, heptene, octene, nonene, decene, dodecene, dodecyldocene, 3-methyl pentene, 3,5,5-trimethylhexene, isobutene, 2-methyl-butene, 2-methyl-pentene, vinyl ether, vinyl carbazole, isoprene, and combinations thereof.

89. (original) The method of claim 87, wherein the olefin monomer is a  $C_2 - C_{30}$  olefin or a  $C_2 - C_{30}$  diolefin.

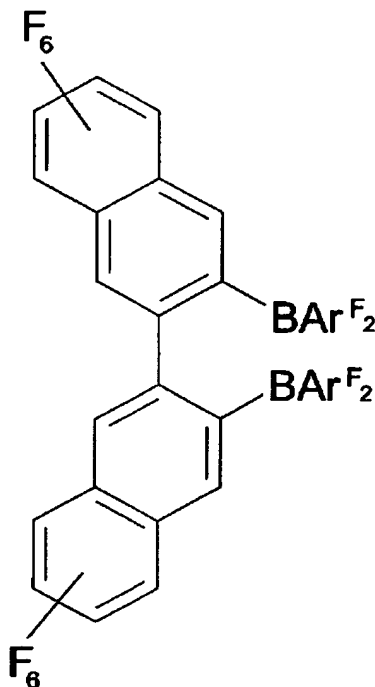
90. (original) The method of claim 87, wherein the olefin monomer is isobutene.

91. (original) The method of claim 87, wherein the organic phase is a hydrocarbon solution of the monomer or a halogenated-hydrocarbon solution of the monomer.

92. (original) The method of claim 87, wherein the neat-monomer reaction phase is a liquid monomer.

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93. (original) A method for cationically polymerizing olefin monomers comprising the step of using a composition having the chemical structure:



wherein Ar<sup>F</sup> = C<sub>6</sub>F<sub>5</sub> or Ar<sup>F</sup><sub>2</sub> = C<sub>12</sub>F<sub>8</sub> as a coinitiator in an organic phase or neat monomer reaction phase.

94. (original) The method of claim 93, wherein the olefin monomer is selected from the group consisting of:

ethylene, propylene, butene, pentene, hexene, heptene, octene, nonene, decene, dodecene, dodecyldocene, 3-methyl pentene, 3,5,5-trimethylhexene, isobutene, 2-methyl-butene, 2-methyl-pentene, vinyl ether, vinyl carbazole, isoprene, and combinations thereof.

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95. (original) The method of claim 93, wherein the olefin monomer is a  $C_2 - C_{30}$  olefin or a  $C_2 - C_{30}$  diolefin.

96. (original) The method of claim 93, wherein the olefin monomer is isobutene.

97. (original) The method of claim 93, wherein the organic phase is a hydrocarbon solution of the monomer or a halogenated-hydrocarbon solution of the monomer.

98. (original) The method of claim 93, wherein the neat-monomer reaction phase is a liquid monomer.

99. (new) A method for cationically polymerizing olefin monomer comprising the step of using a composition having the chemical structure:



as a coinitiator in an organic phase or neat monomer reaction phase;

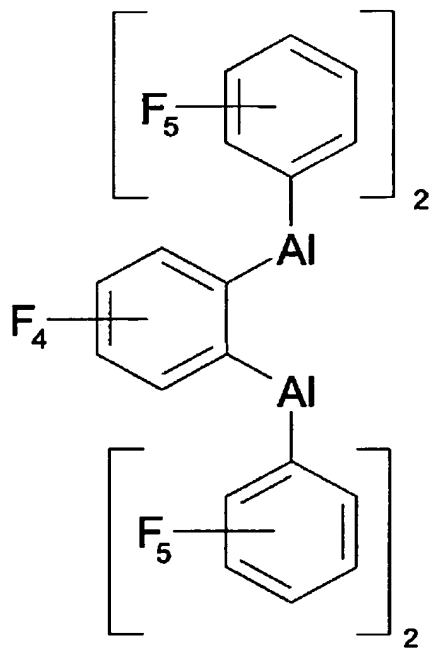
wherein Y is aluminum; wherein each R is independently selected from the group consisting of a perfluorophenyl; 3,5-bis(trifluoromethyl)phenyl; 1-perfluoronaphthyl; 2-perfluoronaphthyl; 2-perfluorobiphenyl; 3-perfluorobiphenyl; 4-perfluorobiphenyl; and  $p-R''_3Si$ -2,3,5,6-tetrafluorophenyl;

wherein R' is 1,2-perfluorophenylenyl; 1,2-perfluoronaphthalenyl; 2,3-perfluoronaphthalenyl; 1,8-perfluoronaphthalenyl; 1,2-perfluoroanthracenyl; 2,3-perfluoroanthracenyl; 1,9-perfluoroanthracenyl; 1,2-perfluorophenanthrenyl; 2,3-perfluorophenanthrenyl; 1,10-perfluorophenanthrenyl; 9,10-perfluorophenanthrenyl; 2,2'-perfluorobiphenylenyl; 2,2'-perfluoro-1,1'-binaphthalenyl; 3,3'-perfluoro-2,2'-binaphthalenyl; or 1,1'-ferrocenyl; and

wherein R'' is a  $C_1, C_2, C_3, C_4, C_5, C_6, C_7, C_8, C_9,$  or  $C_{10}$  alkyl.

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100. (new) The method of claim 99, wherein the chemical structure is:



101. (new) The method of claim 99, wherein the olefin monomer is selected from the group consisting of:

ethylene, propylene, butene, pentene, hexene, heptene, octene, nonene, decene, dodecene, dodecyldecene, 3-methyl pentene, 3,5,5-trimethylhexene, isobutene, 2-methyl-butene, 2-methyl-pentene, vinyl ether, vinyl carbazole, isoprene, and combinations thereof.

102. (new) The method of claim 99, wherein the olefin monomer is a  $C_2 - C_{30}$  olefin or a  $C_2 - C_{30}$  diolefin.

103. (new) The method of claim 99, wherein the olefin monomer is isobutene.

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104. (new) The method of claim 99, wherein the organic phase is a hydrocarbon solution of the monomer or a halogenated-hydrocarbon solution of the monomer.

105. (new) The method of claim 99, wherein the neat-monomer reaction phase is a liquid monomer.